

## REMARKS

Applicant acknowledges receipt of the Office Action mailed April 23, 2003. In the April 23, 2003 Office Action, the Examiner (1) objected to certain claims, (2) rejected certain claims under 35 U.S.C. § 112, second paragraph; and (3) rejected certain claims under 35 U.S.C. § 103(a) based on *Gupta et al.*, singularly, and based on *Gupta et al.* in view of *Wang et al.*

### Status of Claims

In the Office Action mailed April 23, 2003, Applicant is required to elect one of the following groups: Group I, Claims 1-13 drawn to a process; or Group II, Claims 14-18 drawn to an apparatus. In confirmation of telephonic election on April 9, 2003, Applicant elects with traverse to prosecute the claims of Group I (claims 1-13) drawn to a process. Applicant reserves the right to traverse an election requirement in any continuing application that is filed from the present application.

Claims 1-13 are elected.

Claims 14-18 are withdrawn from consideration.

Claims 1, 3, 4, 6, and 7 are currently amended.

Claims 2, 5, 8 - 13 remain pending.

### Objection to The Claims

Claim 6 is objected to for clarification of language in which the phrase "hydrogen gas with gaseous hydrogen product" is used. Applicant intends to use the phrase "hydrogen gas with gaseous hydrocarbon product". Claim 6 has been amended accordingly.

Claim 7 is objected to under 37 CFR 1.75(c) as being of improper dependent form for failing to further limit the subject matter of a previous claim. Claim 7 has been amended to further limit the process steps in Claim 1.

**Rejection of Claims Under 35 U.S.C. § 112, Second Paragraph**

Claims 1-13 stands rejected under 35 U.S.C. § 112, second paragraph as being indefinite. The Examiner states that the language of claim 1, step (d) incorrectly refers to "chemically" reacting the feed. In response, Applicants respectfully traverse this rejection for at least the reason that the Examiner appears to limit the definition of chemical reactions to exclude all reactions involving a catalyst. Nevertheless, without altering the scope of the claim and to facilitate a clearer understanding of the intended meaning of the limitation in question, claim 1 (d) has been reworded to recite "...and hydrogenating said reacted liquid therein; and". Withdrawal of this ground for rejection and allowance of claim 1 is respectfully requested.

The Examiner states that claim 3 lacks clarity in whether "injection" and "bubbling" are separate steps or if the injection causes the bubbling. Without altering the scope of the claim and to facilitate a clearer understanding of the intended meaning of the limitation in question, claim 3 has been reworded to recite "...wherein hydrogen gas is injected into said reactor vessel at said catalytic reaction zone and said hydrogen gas is dispersed through said vessel". Withdrawal of this ground for rejection and allowance of claim 3 is respectfully requested.

The Examiner points out that the term "hot" in claim 4 is a relative term which renders the claim indefinite. Without altering the scope of the claim and to facilitate a clearer understanding of the intended meaning of the limitation in question, claim 4 has been reworded to recite "...wherein said hydrogen gas is injected at a temperature greater than that of said catalytic reaction zone". Withdrawal of this ground for rejection and allowance of claim 4 is respectfully requested.

**Rejection of Claims under 35 U.S.C. § 103(a)**

In the Office Action, claims 1-5, 7-8, and 11-13 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Gupta et al.*, singularly and based on *Gupta et al.* in view of *Wang et al.*

In order to establish a *prima facie* case of obviousness, three criteria must be met: i) there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify or to combine reference teachings; ii) there must be reasonable expectation of success; and iii) the prior art references must teach or suggest all the claim limitations. MPEP § 2143. The Court of Appeals for the Federal Circuit has stated,

...a prior patent must be considered in its entirety, i.e., as a *whole*, including portions that would lead away from the invention in suit, *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1550, 220 USPQ 303, 311 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851, 105 S. Ct. 172, 83 L.Ed.2d 107 (1984); elements of separate patents cannot be combined when there is no suggestion of such combination anywhere in those patents, *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984); and a court should avoid hindsight, *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d at 1553, 220 USPQ at 313.

*Panduit Corporation v. Dennison Manufacturing Co.*, 810 F.2d 1568, 1561-1584 (Fed. Cir. 1987). Also, see MPEP § 2141.03. Thus, in order to establish a *prima facie* case of obviousness, the Examiner must show that the claimed invention would have been obvious to one having ordinary skill in the art without the benefit of Applicants' disclosure. The present rejections under § 103 do not adhere to those requirements.

The Examiner has taken the position that it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to implement the process for treatment of a heavy petroleum feed in a slurry counterflow reactor as disclosed by *Gupta et al.* based on the assertion that a single reactor unit of the *Gupta et al.* multi-stage reactor system can be isolated to hydroprocess heavy petroleum feed. In *Gupta et al.*, a first liquid reaction stage is used in series with a second reaction stage to produce hydroprocessed liquid (col. 1, ll. 17-22). The Examiner appears to disregard the multi-stage reactor system of *Gupta et al.* in which the heavy petroleum is reacted with hydrogen in the presence of a hydroprocessing catalyst in a first liquid reaction stage to produce a liquid/vapor effluent which is further hydroprocessed in a second stage (col. 1, ll. 63-67; col. 2, ll. 1-2). Consequently, *Gupta et al.* teaches that a first stage reactor is required to hydroprocess components of the heavy oil feed prior to introduction to the second stage reactor (col. 3, ll. 35-38). *Gupta et al.*'s stream 56, the liquid/vapor feed to

the second stage reactor, is already hydroprocessed in the first stage reactor to produce a lighter, less contaminated effluent to the second stage reactor. In the practice of the *Gupta et al.* invention, the fresh hydrocarbonaceous feed into the first stage reactor is typically completely liquid (col. 3, ll. 33-35), whereas the second stage reactor receives only hydroprocessed liquid/vapor effluent.

Significantly, *Gupta et al.* suggests that the invention be extended to more than two liquid and one vapor stage (col. 6, ll. 11-13). Consequently, *Gupta et al.* teaches away from the use of a single reactor vessel, as disclosed in Applicant's invention, to a reactor system that employs three or more liquid stages in which the liquid/vapor effluent from the preceding stage becomes the partially hydroprocessed feed for the subsequent stage with accompanying vapor hydroprocessing in one or more vapor stages (col. 6, ll. 13-23). There is no indication in the cited reference that a single reactor stage would hydroprocess heavy petroleum feed. More likely, the modification of *Gupta et al.* to remove one or more of the hydroprocessing pre-treatment stages would destroy and/or severely limit the ability of *Gupta et al.*'s countercurrent reactor to remove hydroprocess heavy petroleum feed. MPEP § 2143.01 "The Proposed Modification Cannot Render the Prior Art Unsatisfactory for Its Intended Purpose."

By contrast, Applicant's invention utilizes a single stage reactor system to process liquid and vapor phases in one reactor. Applicant teaches one reactor stage to hydroprocess typically completely liquid heavy crude feed without pre-treatment of the heavy feed into liquid/vapor phases.

Applicant respectfully traverses this rejection for at least the reason that it incorrectly assumes that the secondary stage reactor of *Gupta* may be isolated, without the benefit of the first stage reactor separation for removal of hydroprocessed heavy crude. Further, *Gupta, et al.* teaches away from single stage hydroprocessing to multi-stage processing with multiple pre-treatment steps.

#### ***Gupta et al.* Fails as Primary Reference**

The Examiner acknowledges that *Gupta et al.* fails to teach the operational details of a slurry phase reactor system and overlooks the fact that *Gupta et al.* does not teach all of the limitations of claims 1- 13.

**Mixing Baffles.** For example, there is absolutely no teaching or suggestion in *Gupta et al.* of baffles that are capable of mixing liquid, catalyst and hydrogen gas. The Examiner contends that the *Gupta et al.* reference discloses downward baffles shown in Fig. 1 near entry point of liquid/vapor effluent. However, the *Gupta et al.* specification describes this device as a tray through which hydroprocessed liquid passes before reaching the catalyst bed (col. 5, ll. 240-26). The specification further describes this tray as a separation means to permit liquid to be distributed over the catalyst bed below and, at the same time, permit the hydrogen vapor to be removed into the vapor reaction stage (col. 4, ll. 55-60). It is plain to see that one of ordinary skill in the art would have no guidance in this reference for selecting the downward baffles with the purpose recited in Applicant's claims. The baffles in Applicant's invention extend from the interior wall of the reactor vessel radially inward towards the axis of the vessel and are embedded entirely in the slurry phase reaction zone. The *Gupta, et al.* vapor-liquid separator means referenced as baffles by the Examiner is not in fluid contact with the catalyst bed and does not encourage mixing but rather specifically encourages separation.

It is plain that one of ordinary skill in the art would have no guidance in this reference for selecting mixing baffles in the catalyst reaction zone. Nothing in the cited reference provides the missing teachings.

**Pressure Let Down System.** The Examiner argues that *Gupta et al.*'s disclosure of a bypass tube is equivalent to Applicant's pressure letdown limitation since the bypass tube functions to prevent flooding in the catalyst bed in the event that the pressure or flow rate of the upward and countercurrently flowing hydrogen gas becomes too great.

*Gupta et al.*, col. 6, ll. 5-10, describes the need to reduce pressure, which occurs when the pressure of the hydrogen gas becomes too great. Flooding of the reactor, or the inability of the hydrogen gas to pass upward due to excessive liquid in the catalyst bed, occurs when the tray 24 fills, or floods, with liquid. When this happens, the liquid head in the well over the opening in the upper portion of the tube provides pressure relief. The elimination of excess liquid in the tray 24 allows hydrogen-containing gas to pass upward from the hydrogen inlet through the catalyst bed.

In *Gupta et al.*, excessive pressure must be reduced because the tray and fixed catalyst bed have become flooded with liquid and the hydrogen gas cannot flow through the excessive liquid. Such an occurrence is common in fixed bed reactors such as that detailed and disclosed in *Gupta et al.* It is not, however, an operational occurrence in slurry bed reactors, which by definition are designed to be flooded with liquid. In slurry phase reactors, the presence of liquid in the catalyst bed is required and passage of upward flowing reactant gas through liquid is not problematic.

By contrast, the purpose of Applicant's letdown system is to remove unconverted heavy residue along with solids (Applicant's Specification, page 10, lines 6-9). The Applicant's invention does not have the intended purpose of reducing the pressure in the system; although tangentially a reduction in pressure does occur with use of Applicant's letdown system. In addition, the reactor of Applicant's invention does not flood because it is a slurry bed reactor, thereby eliminating the need to provide a mechanism to lower vapor pressure in the system. Contrary to interpretation by Examiner, the pressure letdown system in the Applicant's invention is utilized to remove unreacted feedstock that contains asphaltenes, sulphur, nitrogen, and metal compounds. The Applicant's invention allows the removal of the unreacted feedstock in a continuous manner, providing decided advantages of lower operational costs and improvement in operational efficiency.

There is no provision in *Gupta et al.* to remove unconverted feedstock from the reactor system. Examiner has misinterpreted the function of Applicant's bottoms removal system to be similar to that of the *Gupta et al.* pressure relief mechanism. In response, Applicant strongly traverses that misinterpretation of the reference and subsequent conclusion.

#### **Claims 6 - 9**

Claims 6 and 9, which depend directly from claim 1, also stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Gupta et al.* in view of *Wang et al.* With respect to the rejection of claims 6 and 9 over the combination of *Gupta et al.* and *Wang et al.*, Applicant also respectfully traverses for substantially the same reasons as discussed above

with respect to the failure of *Gupta et al.* as a primary reference and, additionally, because *Wang et al.* does not provide the necessary teachings that would result in the process disclosed in Applicant's invention. The *Wang et al.* reference does not correct the failings of the *Gupta et al.* reference. The Examiner takes the position that the *Wang et al.* reference illustrates the placement of a screen at the top of a reactor to prevent any catalyst particles from being carried out the outlet with the reaction products. Applicant asserts that this rejection must fail, as the Examiner has not provided motivation to combine the references. When the references are combined, the Examiner must show that the references include some teaching to combine.

The fact that references may relate generally to the field of hydrocarbon processing does not mean they are combinable; rather, the examiner must identify some suggestion, teaching, or motivation in the prior art. *In Re Dance*, 160 F.3d 1339, 1343 (Fed. Cir. 1998). Combining prior art references without evidence of such a suggestion, teaching, or motivation simply takes the inventor's disclosure as a blueprint for piecing together the prior art to defeat patentability--the essence of hindsight. See, e.g., *Interconnect Planning Corp. v. Feil*, 774 F.2d 1132, 1138 (Fed. Cir. 1985) ("The invention must be viewed not with the blueprint drawn by the inventor, but in the state of the art that existed at the time."). *Id.* at 6.

Moreover, in *In Re Sang Su Lee*, 277 F.3d 1338 (Fed. Cir. 2002), the Federal Circuit emphasized that the motivation to combine "must be based on objective evidence of record." *Id.* "Subjective belief and unknown authority" cannot satisfy an examiner's burden. *Id.* Applicants submit that it is solely the use of hindsight in the present case that allows the Examiner to make the conclusory rejections now being made. Indeed, neither reference provides any suggestion of such a combination. Because the hydroprocessing of heavy crude is clearly not taught or suggested in *Wang et al.*, the process is different, the catalyst may be different, and a different reactor (fixed bed) is employed, there can be no motivation to add a solids filter to the reactor system of *Gupta et al.* Therefore, there is no motivation to combine *Gupta et al.* with *Wang et al.* Neither reference teaches or suggests that additional equipment or processing steps that might be combined to form the process in accordance with the present invention. *Wang et al.* specifically does not

utilize a slurry phase process. The Examiner cannot use the teachings of the present application to find the claimed invention obvious in the prior art. For at least these reasons, dependent claims 6 and 9, which depend directly from claim 1, are nonobvious over the combination of *Gupta et al.* and *Wang et al.* Applicant respectfully traverse the basis of the rejection, namely the combination of *Gupta* and *Wang*, and request that the Examiner reconsider and withdraw the rejection.

### **Conclusion**

Applicant may have at times referred to claim limitations in shorthand fashion, or may have focused on a particular claim element. This discussion should not be interpreted to mean that the other limitations can be ignored or dismissed. The claims must be viewed as a whole, and each limitation of the claims must be considered when determining the patentability of the claims. Moreover, it should be understood that there may be other distinctions between the claims and the prior art, which have yet to be raised, but which may be raised in the future.

Consideration of the foregoing amendments and remarks, reconsideration of the application and withdrawal of the rejections and objections is respectfully requested by Applicant. No new matter is introduced by way of the amendment. It is believed that each ground of rejection raised in the Office Action dated April 23, 2003 has been fully addressed. However, if a telephone conference would facilitate the resolution of any issue, the Examiner is invited to telephone the undersigned at (281) 293-3580. If any fee is due as a result of the filing of this paper please appropriately charge such fee to Deposit Account Number 16-1575, ConocoPhillips Company, Houston, Texas. If a



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petition for extension of time is necessary in order for this paper to be deemed timely filed, please consider this a petition therefor.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Kim S. Manson', written over a horizontal line.

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